National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SET 3205 (DSI-3205)

Coop Summary of the Day - Midwest Climate Center/MCCDP
(Midwestern Climate Center Digitization Project)

March 18, 2003

National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-5001 USA

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Table of Contents

1. Abstract: This data set contains daily temperature and precipitation data plus auxiliary information for 9 Midwestern states and New Mexico (10 states total) for the period 1896-1947. The data were provided to the NCDC as a follow on to an extensive data digitization project carried out by the Midwestern Climate Center (MCC). The MCC project was a collaborative effort by state climatologists to convert early data for IL, IN, IA, KY, MI, MN, MO, NM, OH, and WI that were only available in printed form into digital files. The auxiliary information includes station metadata and corrections to DSI-3200 data that are necessary to get DSI-3205 to fit together properly with DSI-3200. It must be noted that NCDC has the observations from the time the station opened, but the NWS has the current data. Official surface weather observation standards can be found in the Federal Meteorological Handbook.

2. Element Names and Definitions:

RECORD TYPE:

The type of data stored in this record. (Value is "DLY"). Each record contains one month of daily values.

STATION-ID:

This 8-character alphanumeric station identifier is assigned by the National Climatic Data Center. The first two digits refer to a state code (value range is 01-91; reference Table "A"). The next four digits refer to the Cooperative Network Index number (value range is 0001-9999). The last two digits are the Cooperative Network Division Number (value range is 01-10; 99 = Missing Division Number; reference Table "B").

METEOROLOGICAL ELEMENT-TYPE:

The type of meteorological elements stored in this record. The range of values are listed below.

PRCP: Daily precipitation. (Precipitation reading for 24 hours ending at time of observation. Trace is less than 0.005 inch.) Unit Measurement, Inches to Hundredths.

TMAX: Daily maximum temperature. (Maximum temperature reading for 24 hours ending at time of observation.) Unit Measurement, Whole Degrees Fahrenheit.

TMIN: Daily minimum temperature. (Minimum temperature reading for 24 hours ending at time of observation.) Unit Measurement, Whole Degrees Fahrenheit.

METEOROLOGICAL ELEMENT MEASUREMENT UNITS CODE:

The units and decimal position (precision) of the data value for this record (reference Table "E"). See "Known Uncorrected Problems" for additional details.

YEAR: This is the year of the record. Range of values is 1850-current year processed.

MONTH: This is the month of the record. Range of values is 01-12 LST.

FILLER: Filler value is 9999.

NUMBER OF DATA PORTIONS THAT FOLLOW: This indicates the actual number of values reported.

DSI-3200 does not explicitly contain missing values (-99) for individual days. The record length for each month depends on the number of days for which data were collected: that is, if within a month data were collected for only a few days, then the line in DSI-3200 for that month contains only those few data values. On the other hand, DSI-3205 explicitly contains missing values for individual days. If within a month, data were collected for only a few days, then the line in DSI-TD3205 still contains values for all calendar days in the month, including explicitly missing (-99) values for those days without data. In those cases where DSI-TD3205 contains a missing (or any) value for a value already present in DSI-TD-3200, the value in DSI-TD3205 should be assumed to take precedence.

DAY OF MONTH: Contains the day of the month on which the data element was observed. Range of values is 01-31 LST.

HOUR OF OBSERVATION: Contains the hour of the daily observation. Hour of observation is reported using the 24-hour clock with values ranging from 00-23 LST, except in the cases of soil temperatures element-type (where the hour is 99 to indicate missing) and "days with weather" (where the hour is 24). Through June 1967 observations were designated as "AM" or "PM"; these values were set to 06 or 18 respectively during the conversion to TD-3200. From July 1967 through 1981, all observations were set to hour 18 (because the majority are p.m. observations). Beginning January 1982, the actual hour of the observation is indicated

SIGN OF METEOROLOGICAL VALUE

The algebraic sign of the meteorological data value is given as either a blank or a minus sign (-). Blank indicates a positive value and a minus sign represents a negative value (see Known Uncorrected Problems").

VALUE OF METEOROLOGICAL ELEMENT

The actual data value is given as a five-digit integer. One major exception does exist however, for the DYSW (days with weather code) element-type values. A very small number of data values are known to have non-numeric entries.

For fixed length records only when a data value is missing, the sign of the data value is set to "-", the data value is set to "99", flag position 1 is set to "M" and flag position 2 is blank.

Prior to September 1991, when no daily precipitation reading was taken but the amount from that day (if any) is included in a subsequent value, the data value of precipitation is set equal to "00000" and flagged with an "S" in flag position 1. In turn, the successive accumulated amount will be flagged with an "A" in flag position 1. Since September 1991, it has been a practice at NCDC to set the precipitation value to "-99" in this situation; the flagging procedure has not changed.

FLAG1

The Data Measurement FLAG (reference Table "F").

FLAG2
The Data Quality FLAG (reference Table "G").

TABLES

TABLE "A"

State-Code Table

11 Illinois
12 Indiana
13 Iowa
15 Kentucky
20 Michigan
21 Minnesota
23 Missouri
29 New Mexico
33 Ohio
47 Wisconsin

TABLE "E"

Units of Measurement Table

Range of values where b = Blank:

bF	Whole degrees Fahrenheit (right justified
HI	Hundredths of inches
bI	Whole inches (right justified)
bM	Whole miles (right justified)
NA	No units applicable (nondimensional)
TI	Tenths of inches

TABLE "F"

Data Measurement Flag 1

A - Accumulated amount since last measurement.
B - Accumulated amount includes estimated values (since last measurement).
E - Estimated (see Table "G" for estimating method).
J - Value has been manually validated.
M - For fixed length records only.

Flag1 is "M" if the data value is missing. In this case, the sign of the meteorological value is assigned "-" and the value of the meteorological element assigned "99999".

S - Included in a subsequent value.(data value = "00000" OR "99999").
T - Trace (data value = 00000 for a trace).
(- Expert system edited value, not validated.
) - Expert system approved edited value.
Blank - Flag not needed.

Note: The presence or absence of an "E" in Data Measurement Flag 1 is not a reliable source of indicating that a subsequent value replaces an original value. Users should examine Data Quality Flag 2 for a code "0-5" to indicate whether a replacement value follows an original value.

Flag 1 values of "S" and "A" usually occur in pairs (ie. a daily value will have Flag 1 assigned as "S" and the next daily value will have Flag 1 assigned as "A"). For some daily values these flags do not occur in pairs.

Other values occasionally appear in Data Measurement Flag 1 for which documentation is not currently available, e.g., "C" and "s"

TABLE "G"

Data Quality Flag 2

In those cases where a value was judged invalid and a replacement value provided, the codes used to indicate how the replacement value was determined are the same as DSI-3200, with the some additions and clarifications to definitions for FLAG2 (Table G in TD-3200 document). All replacement values were produced manually.

0 - Valid data element.
1 - Valid data element (from "unknown" source, pre-1982).
2 - Invalid data element (subsequent value replaces original value).
3 - Invalid data element (no replacement value follows).
4 - Data element passed through Midwestern Climate Center QC
5 - Original non-numeric data value has been replaced by its deciphered numeric value.
A - Substituted TOBS for TMAX or TMIN
B - Time shifted value
C - Precipitation estimated from snowfall

D - Transposed digits
E - Changed units
F - Adjusted TMAX or TMIN by a multiple of + or -10 degrees
G - Changed algebraic sign
H - Moved decimal point
I - Rescaling other than F, G, or H
J - Subjectively derived value
K - Extracted from an accumulated value
L - Switched TMAX and/or TMIN
M - Switched TOBS with TMAX or TMIN
N - Substitution of "3 nearest station mean"
O - Switched snow and precipitation data value
P - Added snowfall to snow depth
Q - Switched snowfall and snow depth
R - Precipitation not reported; estimated as "O"
S**- Manually edited value (** - Manually edited value could be derived by any of the procedures noted by Flags A-R.
T - Failed internal consistency check
U - Failed areal consistency check (beginning Oct. 1992)
X - value in MCCDP verifies, estimated value in DSI-3200 accepted as replacement (Wisconsin only)
Y - estimated value from Michigan quality control (Michigan only)
Z - value shifted by a day

3. **Start Date**: Most stations begin in 1896

4. **Stop Date**: Most stations stop in 1947

5. **Coverage**: 10 states: IL, IN, IA, KY, MI, MN, MO, NM, OH, WI

6. **How to Order Data**:

Ask NCDC's Climate Service about costs of obtaining this dataset.
Phone: 828-271-4800
FAX: 828-271-4876
E-mail: **NCDC.Orders@noaa.gov**

7. **Archiving Data Center**:

National Climatic Data Center,
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001

8. **Technical Contact**:

Dr Karen Andsager at andsager@uiuc.edu or by writing to:

Midwestern Climate Center
Illinois State Water Survey
2204 Griffith Drive
Champaign, IL 61820-7495. (verified 22 Nov 02)

9. **Known Uncorrected Problems**: Time of Observation. The observation times were not keyed in this project. In the Midwest, about 90% of the pre-1948 temperatures were taken in the afternoon. For some states, the maximum

temperatures were published shifted back one day for stations with morning observation times; for the most part, the 24-hour high does occur on the previous day for stations recording in the morning. These shifted data were keyed as published; un-shifting of the maximum temperatures was not attempted. Following the convention of DSI-3200, all observation times in DSI-3205 are set to 18 to indicate afternoon observation times, which is generally correct.

10. Quality Statement: Quality Control

The MCCDP data passed through a set of quality control procedures designed to screen for keying errors. Tests included checks for extreme limits and spatial and temporal consistency. A very small number of values were manually judged invalid during the QC process. Replacement values are provided for these values using the DSI-3200 flagging format for Illinois, Indiana, Kentucky, Missouri, New Mexico, Ohio, and Wisconsin. Replacement values for Iowa were applied during the keying process; only the replacement values appear in the MCCDP Iowa database, and they are unflagged.

For Michigan data, some quality control was performed on the pre-1981 DSI-3200 data by the Michigan State Climatologist. All pre-1981 DSI-3200 data as well as data keyed specifically for MCCDP are contained within the MCCDP database for Michigan. Estimated values resulting from the quality control performed in Michigan are given a special flag (see Table G). Likewise, for Minnesota, some quality control has been performed on the pre-1948 TD-3200 data in Minnesota, so all pre-1948 DSI-3200 data as well as data keyed for MCCDP are contained within the MCCDP data base for Minnesota. Estimated values for Minnesota resulting from the Minnesota quality control are not flagged in the MCCDP data base

11. Essential Companion Datasets: There are 5 auxiliary files (available on the HDSS, directory 3205_01) that are essential for the use of the data:

1) file mccstnos - station information
2) file crt3200 - corrections to TD3200 data that are necessary to get DSI-D3205 to fit together properly with DSI-3200 data
3) file ch3200 - corrections to individual values in TD3200
4) file oth3200 - corrections to TD3200 to eliminate very short records from TD3200
5) file readme - Brief version of TD3205 documentation that includes formats for the auxiliary files

The auxiliary files are small enough to be copied to a single diskette.

12. References:

More detailed information on this project is contained in the article, "An expanded digital daily database for climatic resources applications in the Midwestern United States", Kunkel, K.E., K. Andsager, G. Conner, W.L. Decker, H.J. Hillaker, Jr., P.N. Knox, F.V. Nurnberger, J.C. Rogers, K. Scheeringa, W.M. Wendland, J. Zandlo, and J.R. Angel, Bulletin of the American Meteorological Society, Vol. 79, pp. 1357-1366, July, 1998.